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January 29, 1982

Dr. Robert N. Buchal
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AFOSR-IR-82-1559

Subject: Final Report for Grant No. AFOSR-80-0269

Dear Dr. Buchal:

The above-referenced grant from the Air Force Office of Scientific Research to the University of Kentucky Research Foundation supported the conduct of a meeting among selected scientist entitled "Mathematical Foundations of the Singularity Expansion Method," held 19-21 November, 1980 at the Carnahan House meeting center of the University of Kentucky in Lexington, Kentucky. Dr. Lennart Marin of the Dikewood Corporation, Santa Monica, California, served as moderator for the meeting and I was organizer. In addition, twelve scientist—six engineering scientists and six mathematicians—were present as invited participants and their travel and subsistence costs were defrayed using grant funds. The "Principal Participants" list attached indicates names and addresses of those who were present. In addition, we circulated invitations within the singularity expansion research community for those who would like to attend the meeting at their own expense as observers. The "Additional Attendees" list attached provides the names and addresses of these individuals.

In my opinion the intent of this meeting to bring together engineering scientists and mathematicians to discuss matters of detail and of rigor pertaining to the singularity expansion method was well served. The discussions were quite open and frank and, as best I could observe, there was a substantial amount of interchange in private conversations among participants when meeting sessions were adjourned. In the year since the meeting, new results related to SEM have emerged through thinking stimulated at the meeting.

The proceedings of the meeting are being reported as a special issue of the journal *Electromagnetics* (vol. 1, no. 4) which is at the printers at this writing. Each of the invited participants except for Professors Howland and Mittra have prepared manuscripts which are included in this special issue. (Professor Howland felt that his own work was not closely enough related to the singularity expansion method to allow him to make

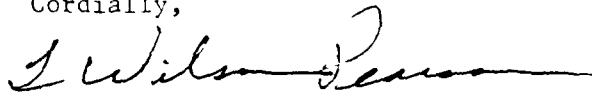
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January 29, 1982

a significant contribution to this volume and Professor Mittra had no new results to report.) In addition, Professor Herbert Uberall of the Catholic University, Washington, DC, has prepared a manuscript which is included in this volume. Professor Uberall's work in acoustic scattering bears heavily on the singularity expansion method in electromagnetics and he would have been included in the invitation list had we been aware of his work earlier. I have included a listing of the paper titles and authorship in this special issue and will provide you with copies of the issue as soon as they are available to me within the next few weeks.

I should acknowledge the assistance of several people in the successful conduct of this meeting. Professor C. L. Dolph of the University of Michigan was most helpful in planning this meeting from its conception. He proved a useful resource in identifying mathematicians who should receive invitations to the meeting and contributed to the discussions during its conduct. Dr. Carl E. Baum of the Air Force Weapons Laboratory provided the same sort of council in connection with the engineering scientists list. Dr. Marin in serving as moderator and subsequently as co-editor with me for the special issue of *Electromagnetics*. We greatly acknowledge your own support both in the form of encouragement and the financial support through the physics directorate of AFOSR in making this meeting a reality.

Cordially,



L. Wilson Pearson, Ph.D.
Associate Professor

LWP:teb

Enclosure

cc: Susan Aylward, UKRF
Benjamin Leon

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MATTHEW J. KERPER
Chief, Technical Information Division

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CONTENTS OF SPECIAL ISSUE OF ELECTROMAGNETICS

1. "The Singularity Expansion Method: Background and Developments"
Carl E. Baum
2. "Major Results and Unresolved Issues in Singularity Expansion Method"
Lennart Marin
3. "On Some Mathematical Aspects of SEM, EEM and Scattering"
C. L. Dolph
4. "On the Singularity and Eigenmode Expansion Methods (SEM and EEM)"
A. G. Ramm
5. "Scalar Singularity Expansion Method and Lax-Phillips Theory"
Maurice I. Sancer
6. "Resonances and Surface Waves: The Inverse Scattering Problem"
Herbert Überall
7. "Radar Echo Analysis by the Singularity Expansion Method"
Calvin H. Wilcox
8. "Complex Singularities of the Impedance Functions of Antennas"
C. T. Tai
9. "On the Use of Singularity Expansion Method for Analysis of Antennas
in Conducting Media"
F. M. Tesche and D. V. Giri
10. "New Relations for the Characteristic Singularities of Bounded
Scatterers; Preliminary Report"
R. K. Ritt
11. "Effect of Changes in Fundamental Solutions on Singularities of the
Resolvent"
Ralph E. Kleinman
12. "Large Frequency Asymptotic Properties of Resolvent Kernels"
Donald R. Wilton
13. "Evidence Which Bears on the Left Half Plane Asymptotic Behavior
of the SEM Expansion of Surface Currents"
L. Wilson Pearson

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